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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/614,673	LIN ET AL.	
	Examiner	Art Unit	
	Erick Rekstad	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28,30-34 and 36-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28 and 30-34, and 36-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This is a Non-Final Rejection for Application no. 10/614,673 in response to the RCE filed on August 16, 2007.

Response to Arguments

Applicant's arguments filed August 16, 2007 have been fully considered but they are not persuasive.

The Applicant argues that Kondo does not disclose determining a similarity of one of the reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in the selected current macroblock and the reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 1. The Applicant cites col. 6 line 60-col. 7 line 6 for support of Kondo's lack of discloser.

The Examiner respectfully disagrees. It is noted by the Examiner that the claim states "comprising the steps" and "pixel unit comprises an average of two adjacent pixels". The use of "comprising" is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. Therefore, the pixel unit may contain more then just the average of two adjacent pixels. As taught by Kondo, the pixel unit is the average of four adjacent pixels as shown in Figure 9B and the equation of m1(Col 8 Line 67). Pixel X1 is adjacent to X2 and X5. Pixel X2 is adjacent to X1 and X6. Pixels X5 and X6 are also adjacent. Kondo, teaches the use of these values for determining a similarity between a reference macroblock and current macroblock (Col 9 Lines 16-42). The determining a similarity is repeated for all of the reference blocks in the search

range (Col 10 Lines 19-37). It is again suggested by the Examiner that the claims be amended to clearly define the determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in said selected current macroblock and said reference macroblocks. Wherein the claims are amended to define one calculated pixel unit as the average of only two adjacent pixels.

The Applicant further argues that Kondo does not teach the features of claim 2 and 3. Specifically, the Applicant states "Kondo does not disclose calculating an absolute difference of each calculated pixel unit for the current macroblock and a corresponding calculated pixel unit for one of the reference macroblocks resulting in a plurality of calculated absolute differences, as recited in claim 2.

The Examiner respectfully disagrees. Kondo specifically teaches the calculating of absolute differences for each of the pixel units as shown in the equation on Col. 9 Line 20. Hm is the sum of the absolute differences calculated for each pixel unit. Note the reference block is the inspection block of Kondo.

In regards to Applicant's arguments related to claims 8-12 and cited reference Kondo, the arguments appear to be equivalent to those for claims 1-3 and therefore are rebutted as shown above for claims 1-3.

In regards to the Applicant's arguments related to the rejection of claims 1, 8 and 34 in view of cited reference US Patent 6,011,870 to Jeng, the Examiner respectfully disagrees. Jeng specifically teaches the calculating pixel-unit comprises an average of two adjacent pixels (Col 14 Lines 1-13 and Col 15 Lines 26-34). The citation teaches

for the first coarse motion estimation (MEB 6 in Figure 6) the pixels are averaged as shown in Figure 11A. It is again noted by the Examiner that the claim states "comprising the steps" and "pixel unit comprises an average of two adjacent pixels". The use of "comprising" is inclusive or open-ended and does not exclude additional, unrecited elements or method steps.

The Applicant further argues that Kondo does not teach the use of sum of squares. As cited in the rejection, Kondo teaches the prior art using sum of absolute differences or sum of square differences (Col 2 Lines 43-51). Kondo further teaches an example of using sum of square differences (Col 9 Lines 51-55). Therefore it would have been obvious to use the well known techniques in the prior art for comparing blocks.

In regards to the Applicant's arguments related to claim 27, the Examiner has shown above that Jeng teaches the use of a calculated pixel unit comprising an average of two adjacent pixels. Jeng specifically teaches the calculating pixel-unit comprises an average of two adjacent pixels (Col 14 Lines 1-13 and Col 15 Lines 26-34). The citation teaches for the first coarse motion estimation (MEB 6 in Figure 6) the pixels are averaged as shown in Figure 11A.

In regards to the Applicant's arguments related to claims 6, 7 and 17-20, the Examiner has shown that both Kondo and Jeng teach the requirements of the independent claims. The Applicant's arguments are based on the above rebutted arguments and therefore have been responded to.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, and 8-12 are rejected under 35.U.S.C. 102(b) as being anticipated by US Patent 5,576,772 to Kondo.

[claim 1]

Kondo teaches a motion estimation method for estimating a motion vector between a reference image frame and a current image frame, each of said reference frame and said current frame being formed by a plurality of pixels (Abstract, Figs. 10a-e), the method comprising the steps of:

(a1) dividing a plurality of reference macroblocks each comprising a plurality of adjacent pixels within said reference frame, a set of said reference macroblocks forming a search range (Col 9 Line 58-63, Fog. 10a).

(a2) dividing at least one current macroblock comprising a plurality of continuous pixels from said current frame, each of said reference macroblocks and said at least one current macroblock having generally the same size and shape with corresponding pixel distribution (Col 1 Lines 5-19, Col 2 Lines 10-14 and Lines 34-40, Figs. 2A and 4). Note: Kondo's invention relates to an optimization of the motion vector detection in MPEG compression, therefore it would be inherent that Kondo's invention divides the frames into macroblocks as suggested by the citation above.

(a3) determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in said selected current macroblock and one of said reference macroblocks, wherein one calculated pixel unit comprises an average of two adjacent pixels (Col 6 Line 64-Col 7 Line 42, Col 8 Lines 23-26, Figs 6B and 9B). It is noted by the Examiner that the claim does not require the pixel units to be only based on two horizontally adjacent pixels therefore Kondo's teaching of a 2x2 block of pixels is viewed by the Examiner to satisfy the requirements of the claim.

(a4) repeating step (a3) for all of said reference macroblocks in said search range (Col 10 Lines 9-40, Fig. 10B);

(a5) determining a motion estimation of said current frame and said reference frame based on said respectively determined similarity in steps (a3) and (a4) (Col 10 Lines 41-67, Fig. 10C).

[claims 2, 3, 9 and 10]

Kondo further teaches the calculating an absolute difference of each calculated pixel unit in said current macroblock and a corresponding calculated pixel unit in one of the reference macroblocks resulting in a plurality of calculated absolute differences; and

Summing said calculated absolute differences for all of said calculated pixel units in said current macroblock (Col 9 Lines 16-33 and Lines 45-49)

Kondo teaches the determining a motion estimation vector between said selected current macroblock and a selected one of said reference macroblocks within said search range having a smaller sum of said calculated absolute differences with said

current macroblock than a sum of calculated absolute differences between said selected current macroblock and each other reference macroblock within said search range (Col 2 Lines 43-51, Col 9 Lines 28-49, Col 10 Lines 19-28, Fig. 10D).

[claim 8]

As shown above from claim 1, Kondo teaches the requirements of steps (b1)-(b3). Kondo further teaches:

(b4) determining similarities for said first predetermined set of reference macroblocks in said search range for performing a coarse tune operation;

(b5) determining a preferred reference macroblock from said first predetermined reference macroblocks based on said similarities;

(b6) determining similarities for a second predetermined set of reference macroblocks around said preferred reference macroblock based on pixels of said current macroblock and said second predetermined set of reference macroblocks for performing a fine tune operation; and

(b7) determining a motion estimation of said current frame and said reference frame from said determined similarities in step (b6) (Col 6 Line 64-Col 7 Line 10, Col 10 Lines 9-67, Figs. 10B and 10C).

[claims 11-12]

Kondo teaches the use of absolute difference of pixels between the current macroblock and a reference macroblock (Col 2 Lines 43-51 and Col 9 Lines 50-55).

Claims 1-3, 8-10, 21-26, 34, and 36-38 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,011,870 to Jeng et al.

[claims 1, 8, and 34]

Jeng teaches a motion estimation method for estimating a motion vector between a reference image frame and a current image frame, each of said reference frame and said current frame being formed by a plurality of pixels (Abstract), the method comprising the steps of:

(a1 and b1) dividing a plurality of reference macroblocks each comprising a plurality of adjacent pixels within said reference frame, a set of said reference macroblocks forming a search range (Col 10 Line 62-Col 11 Line 4).

(a2 and b2) dividing at least one current macroblock comprising a plurality of continuous pixels from said current frame, each of said reference macroblocks and said at least one current macroblock having generally the same size and shape with corresponding pixel distribution (Col 2 Lines 8-24, Col 10 Line 62-Col 11 Line 4). Note: Jeng's invention relates to an optimization of the motion vector detection in MPEG compression, therefore it would be inherent that Jeng's invention divides the frames into macroblocks as suggested by the citation above.

(a3 and b3) determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in said selected current macroblock and on of said reference macroblocks, wherein one calculated pixel unit comprises an average of two adjacent pixels (Col 3 Lines 39-43, Col 8 Lines 12-26, Col 14 Lines 1-13, Col 15 lines 26-34, Fig. 11a).

(a4) repeating step (a3) for all of said reference macroblocks in said search range (Col 5 Line 52-Col 6 Line 2);

(b4) determining similarities for said first predetermined set of reference macroblocks in said search range for performing a coarse tune operation;

(b5) determining a preferred reference macroblock from said first predetermined reference macroblocks based on said similarities;

(b6) determining similarities for a second predetermined set of reference macroblocks around said preferred reference macroblock based on pixels of said current macroblock and said second predetermined set of reference macroblocks for performing a fine tune operation; and

(a5 and b7) determining a motion estimation of said current frame and said reference frame from said determined similarities in step (b6) (Col 3 Lines 39-51, Col 10 Lines 42-52, Figs. 1 and 6).

As shown by the citations, Jeng teaches the use of the motion estimation for use with MPEG compression. MPEG compression inherently has the features of part (a) of claim 34. The remaining requirements (b)-(p) are equivalent to the requirements of claim 1 and therefore are rejected on the same grounds.

[claims 2, 3, 9 and 10]

Jeng teaches the use of sum of absolute differences (Abstract, Col 2 Lines 9-24).

[claims 21-26, and 36-38]

Jeng further teaches the use of the method for fields or frames, where the frames are made up of even and odd lines (Col 3 Lines 17-38, Figs. 7A and 7B). The citation further shows the determining of a top field motion estimation and a bottom field motion estimation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 5, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo.

[claims 4, 5, 13 and 14]

As shown above for claims 3, 9 and 10, Kondo teaches the use of SAD to determine the best match. Kondo further teaches the use of other calculating means such as sum of square differences (Col 2 Lines 43-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to use sum of square differences in place of SAD in the motion estimation process as Kondo teaches such an option is well known in the art (Col 2 Lines 43-51).

[claims 15 and 16]

As shown above for claims 11 and 12, Kondo teaches the use of absolute difference of pixels between the current macroblock and a reference macroblock. Kondo further teaches the use of other calculating means such as sum of square differences (Col 2 Lines 43-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to use sum of square differences in place of SAD in the motion estimation process as Kondo teaches such an option is well known in the art (Col 2 Lines 43-51).

Claims 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng.

[claims 27 and 33]

As shown in Figure 2, Jeng teaches the use of a motion estimation device comprising a controller (12), a first motion estimation processor (6, Fig. 1) and a second motion estimation processor (8, Fig. 1) (Col 2 Line 61- Col 3 Line 4, Col 4 Lines 12-27). The device is taught by Jeng to perform the steps as shown above for claim 8. Jeng teaches the controller obtains the video from other on-chip encoding circuitry, embedded imaging or video detection device integrated on-chip or equivalently coupled discretely thereto as separate digital video signal detection or generation appliance (Col 4 Lines 15-20). Jeng does not specifically teach the use of a frame buffer. It is well known in the art to use memory (SDRAM or DRAM) in order to buffer incoming images/video for processing (Official Notice). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a buffer in the system of Jeng in order to store images for processing.

[claims 28-32]

As shown above for claim 8, Jeng teaches the method for the device of claims 27-32. Note, Jeng teaches the macroblocks are 16x16 or 16x8 as required by claim 32 (Col 3 Lines 21-23).

Claims 6, 7, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo as applied to claims 1 and 8 above, and further in view of US Patent 6,442,203 to Demos.

[claims 6, 7, 17 and 20]

As shown above Kondo teaches the requirements of claims 1 and 8. Kondo further teaches the use of SAD to determine motion vectors (Col 9 Lines 45-55). Kondo is silent on the use of multiplication.

Demos teaches the use of SAD to determine motion vectors (Col 12 Lines 28-42). Demos teaches an alternative to this method by using the AC correlation (Col 13 Lines 4-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the AC correlation method of Demos with the method of Kondo in order to detect objects moving into the light, or out of the light, or in fading conditions as taught by Demos (Col 13 Lines 4-15).

Claims 6, 7, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng as applied to claims 1 and 8 above, and further in view of US Patent 6,442,203 to Demos.

[claims 6, 7, 17 and 20]

As shown above Jeng teaches the requirements of claims 1 and 8. Jeng further teaches the use of SAD to determine motion vectors (Abstract). Jeng is silent on the use of multiplication.

Demos teaches the use of SAD to determine motion vectors (Col 12 Lines 28-42). Demos teaches an alternative to this method by using the AC correlation (Col 13 Lines 4-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the AC correlation method of Demos with the method of Jeng in

order to detect objects moving into the light, or out of the light, or in fading conditions as taught by Demos (Col 13 Lines 4-15).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick Rekstad whose telephone number is 571-272-7338. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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